CLAIMS

1. A method of producing a P(phosphorus)-doped silicon single crystal by Czochralski method, wherein, at least, a growth of the single crystal is performed so that an Al (aluminum) concentration is 2×10^{12} atoms/cc or more.

2. The method of producing a P-doped silicon single crystal according to Claim 1, wherein the growth of the single crystal is performed so that a P concentration is 1×10^{14} atoms/cc or more in the silicon single crystal.

3. The method of producing a P-doped silicon single crystal according to Claim 1 or 2, wherein in the growth of the single crystal, it is pulled so that a value of F/G ($mm^2/°C \cdot min$) is a value of 0.2 or less, where F (mm/min) is the pulling rate and G (°C/mm) is an average value of a temperature gradient in the crystal along a pulling axis from the melting point of silicon to 1400°C.

4. The method of producing a P-doped silicon single crystal according to any one of Claims 1 to 3, wherein the crystal growth is performed in the range of N region and I region.

5. A P-doped silicon single crystal produced by the method according to any one of Claims 1 to 4.

6. A silicon wafer which is sliced from the P-doped silicon single crystal according to Claim 5.

7. A P(phosphorus)-doped N-type silicon single crystal wafer wherein at least an Al (aluminum) concentration is 2×10^{12} atoms/cc or more.

8. The P-doped N-type silicon single crystal wafer according to Claim 7 wherein a P concentration in the wafer is 1×10^{14} atoms/cc or more.

9. The P-doped N-type silicon single crystal wafer according to Claim 7 or 8, wherein the wafer is that the whole plane of the wafer is N region and/or I region.